N- And P-Channel Logic Level Enhancement Mode MOSFET

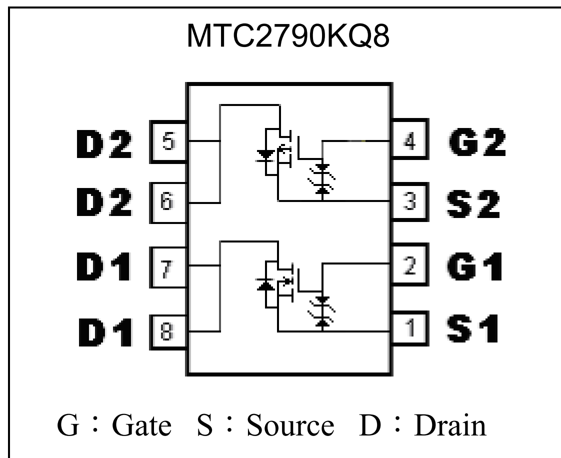
MTC2790KQ8

	N-CH	P-CH
BV_{DSS}	30V	-30V
I_D@V_{GS}=10V(-10V), T_A=25°C	7A	-6A
$R_{DSON(TYP.)}$@V_{GS}=10V(-10V)	12.7mΩ	41.8mΩ
$R_{DSON(TYP.)}$@V_{GS}=4.5V(-4.5V)	16.6mΩ	61.6mΩ
$R_{DSON(TYP.)}$@V_{GS}=4V(-4V)	18.5mΩ	69.9mΩ

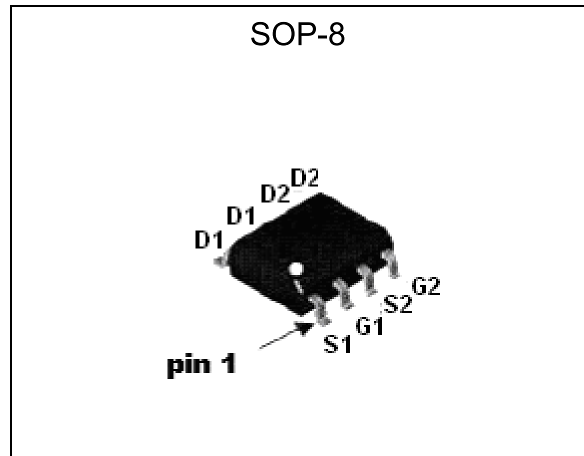
Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free lead plating and halogen-free package
- ESD protected gate

Equivalent Circuit

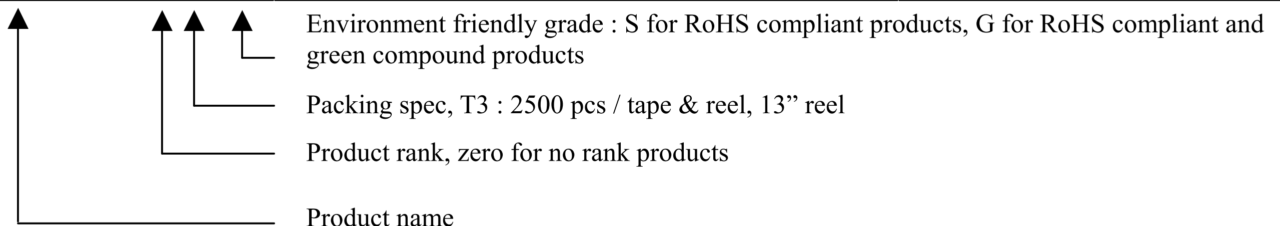


Outline



Ordering Information

Device	Package	Shipping
MTC2790KQ8-0-T3-G	SOP-8 (Pb-free lead plating & halogen-free package)	2500 pcs / Tape & Reel



Absolute Maximum Ratings (T_C=25°C, unless otherwise noted)

Parameter		Symbol	Limits		Unit
			N-channel	P-channel	
Drain-Source Breakdown Voltage		BV_{DSS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current (Note 2)	T_A=25 °C, V_{GS}=10V (-10V)	I_D	7	-6	A
	T_A=70 °C, V_{GS}=10V (-10V)		5.6	-4.8	
Pulsed Drain Current (Note 1)		I_{DM}	40	-24	
Power Dissipation for Dual Operation		P_D	2		W
Power Dissipation for Single Operation			1.6 (Note 2)		
			0.9 (Note 3)		
Operating Junction and Storage Temperature Range		Tj; Tstg	-55~+150		°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	40	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	78 (Note 2)	
		135 (Note 3)	

Note : 1.Pulse width limited by maximum junction temperature.
2.Surface mounted on 1 in² copper pad of FR-4 board, pulse width≤10s.
3.Surface mounted on minimum copper pad, pulse width≤10s.

N-Channel Electrical Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.5		V_{DS}=10V, I_D=1mA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=30V, V_{GS}=0V
	-	-	10		V_{DS}=24V, V_{GS}=0V, Tj=70°C
*$R_{DS(ON)}$	-	12.7	16.5	mΩ	V_{GS}=10V, I_D=3A
	-	16.6	21.6		V_{GS}=4.5V, I_D=3A
	-	18.5	24.0		V_{GS}=4V, I_D=3A
*G_{FS}	-	4	-	S	V_{DS}=10V, I_D=3A
Dynamic					
Ciss	-	437	-	pF	V_{DS}=20V, V_{GS}=0V, f=1MHz
Coss	-	69	-		
Crss	-	54	-		
*$t_{d(ON)}$	-	6	-	ns	V_{DS}=15V, I_D=3A, V_{GS}=10V, R_G=10Ω
*t_r	-	18.8	-		
*$t_{d(OFF)}$	-	41	-		
*t_f	-	25	-		
*Qg	-	12.5	-	nC	

*Qgs	-	1.8	-		V_{DS}=15V, I_D=7A, V_{GS}=10V
*Qgd	-	3.4	-		
Body Diode					
*V_{SD}	-	0.83	1.2	V	V_{GS}=0V, I_S=6A
*trr	-	7.9	-	ns	I_F=6A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	2.9	-	nC	

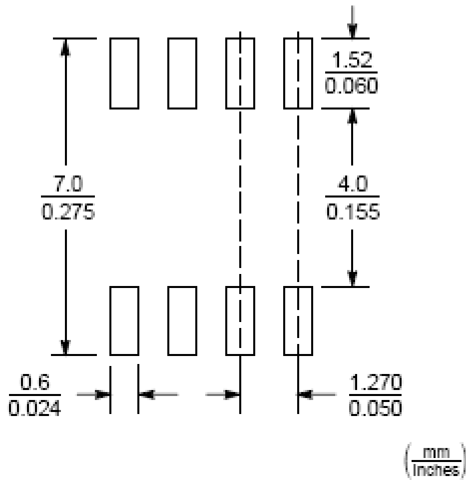
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

P-Channel Electrical Characteristics (Tc=25°C, unless otherwise specified)

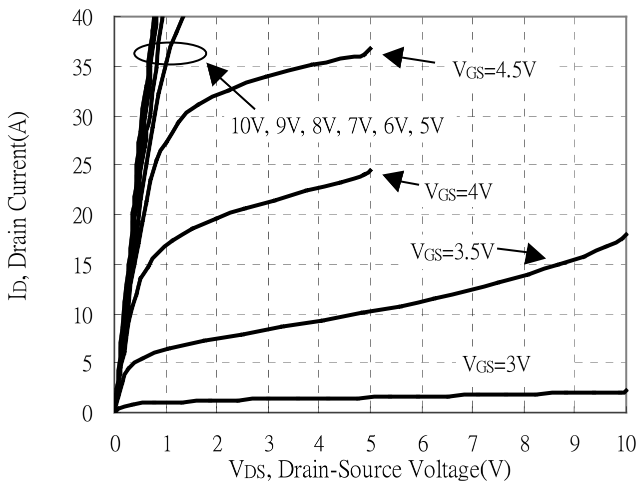
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-30	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-1.0	-	-2.5		V_{DS}=-10V, I_D=-1mA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	-1		V_{DS}=-30V, V_{GS}=0V
	-	-	-10		V_{DS}=-24V, V_{GS}=0V, Tj=70°C
*$R_{DS(ON)}$	-	41.8	55	mΩ	V_{GS}=-10V, I_D=-3A
	-	61.6	80		V_{GS}=-4.5V, I_D=-3A
	-	69.9	91		V_{GS}=-4V, I_D=-3A
*G_{FS}	-	4.9	-	S	V_{DS}=-10V, I_D=-3A
Dynamic					
Ciss	-	383	-	pF	V_{DS}=-20V, V_{GS}=0V, f=1MHz
Coss	-	65	-		
Crss	-	54	-		
*td(ON)	-	6.4	-	ns	V_{DS}=-15V, I_D=-3A, V_{GS}=-10V, R_G=10Ω
*tr	-	19.2	-		
*td(OFF)	-	31.6	-		
*tf	-	12.2	-		
*Qg	-	11	-	nC	V_{DS}=-15V, I_D=-7A, V_{GS}=-10V
*Qgs	-	1.7	-		
*Qgd	-	2.7	-		
Body Diode					
*V_{SD}	-	-0.93	-1.2	V	V_{GS}=0V, I_S=-6A
*trr	-	14	-	ns	I_F=-6A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	7.7	-	nC	

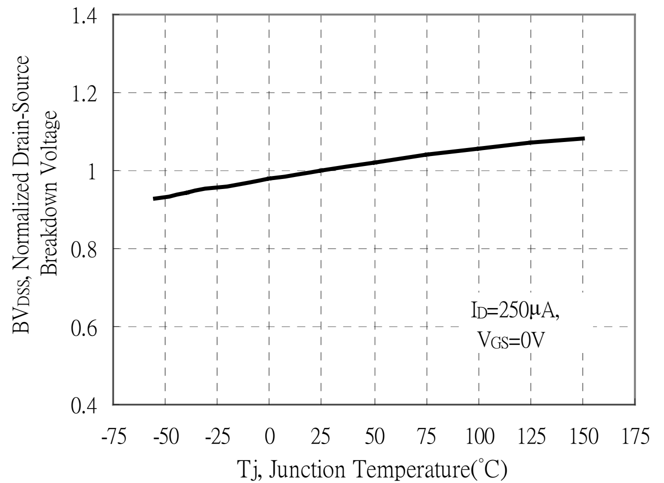
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

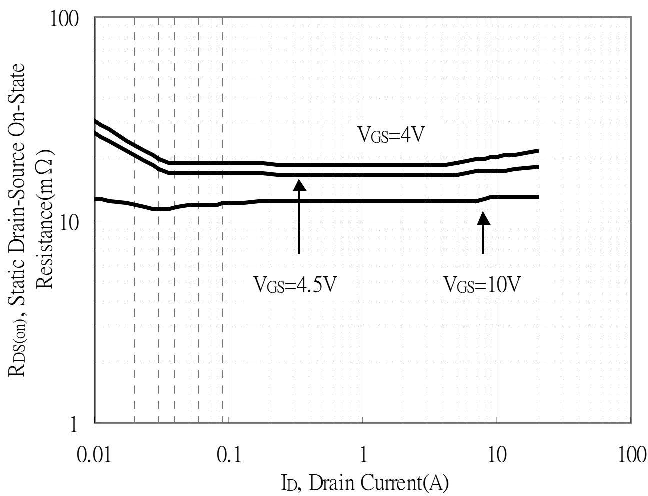
Recommended Soldering Footprint

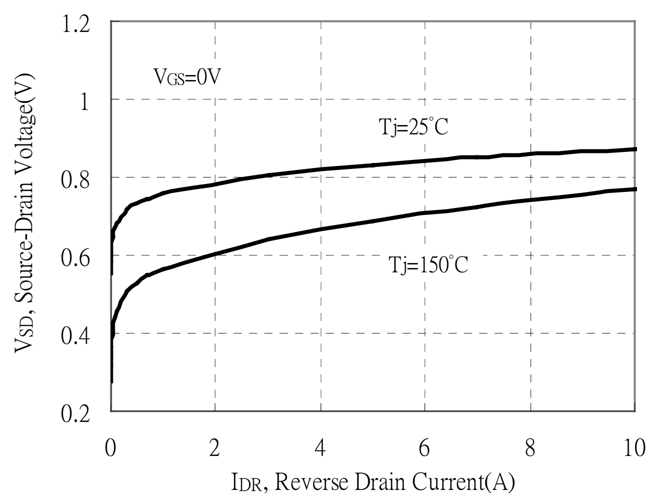


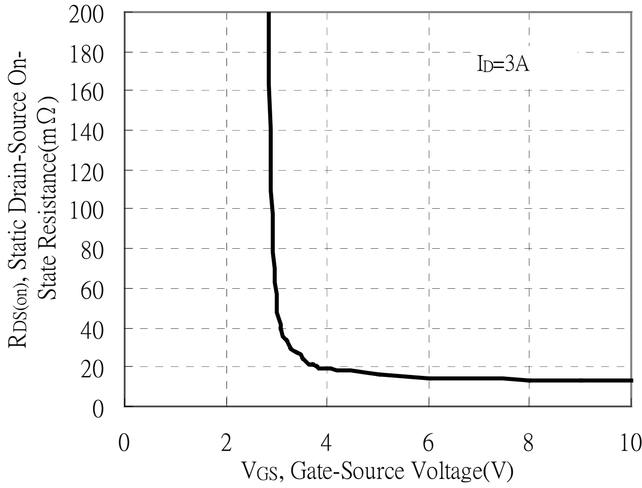
Typical Characteristics : Q1(N-channel)

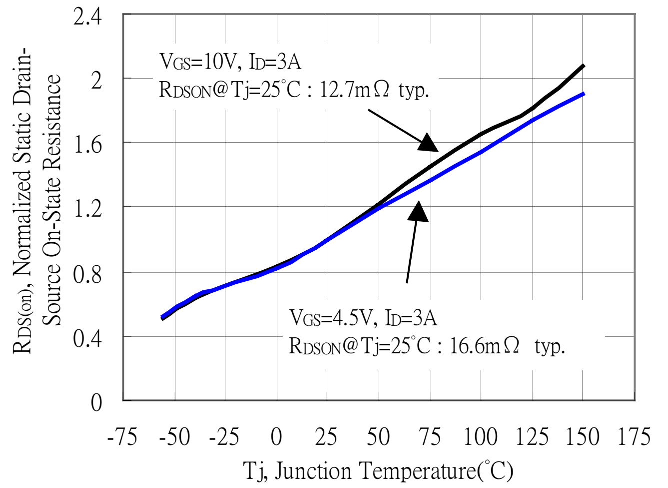












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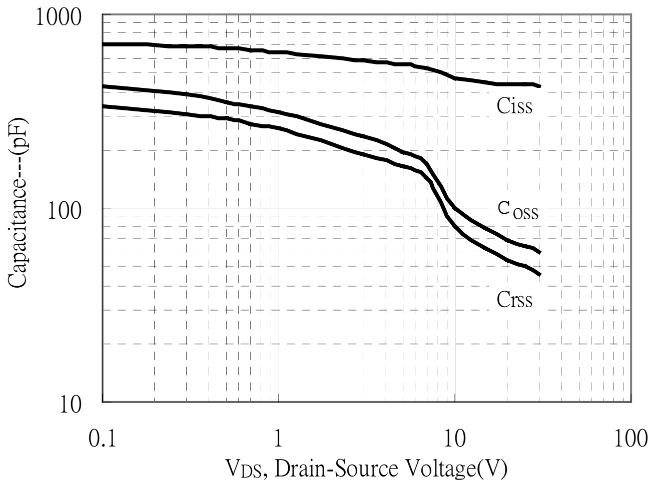

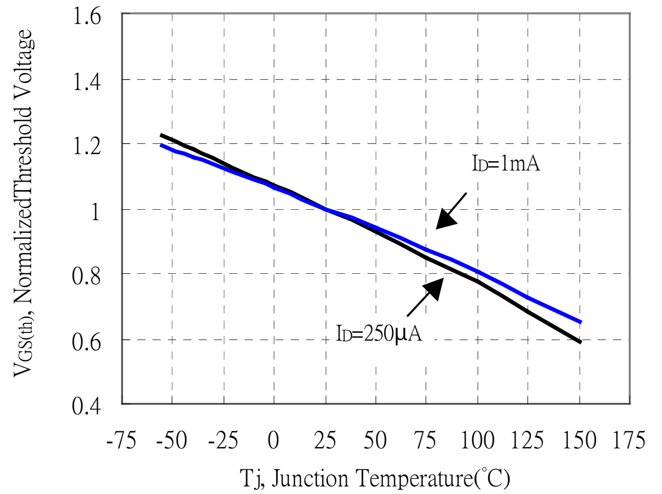

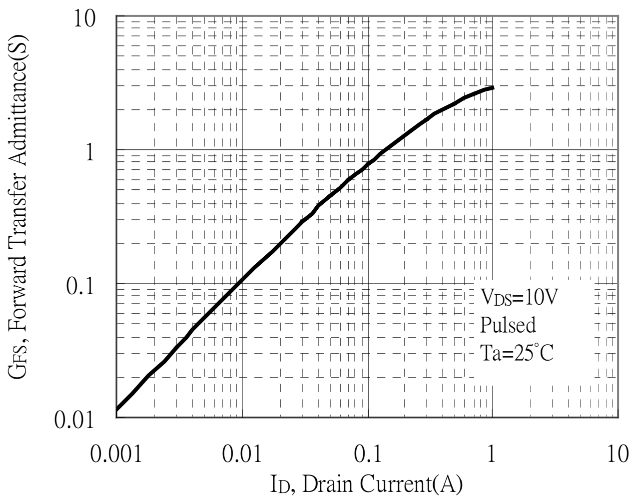

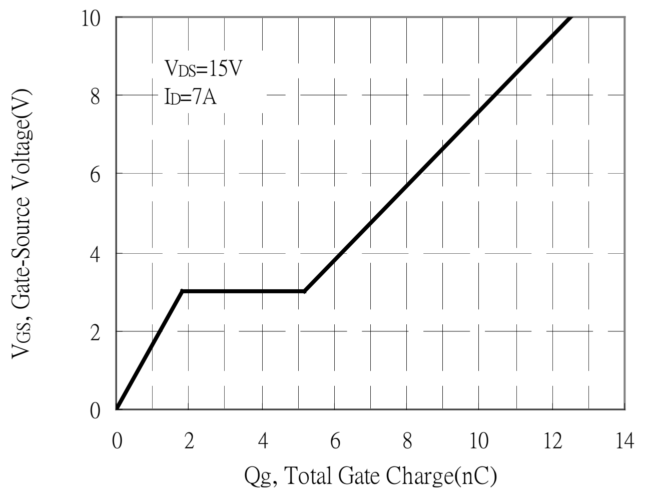

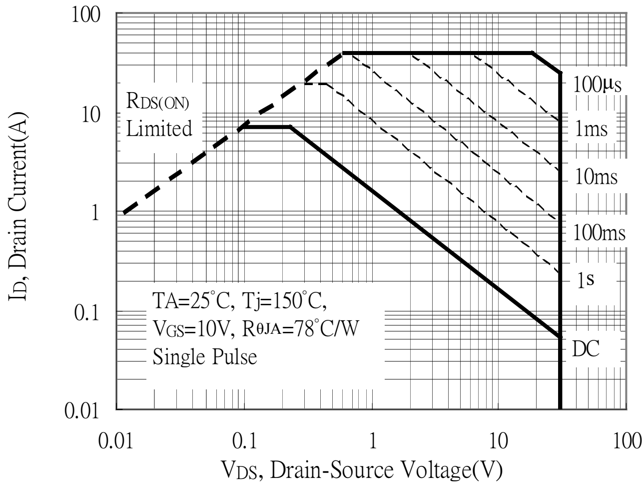

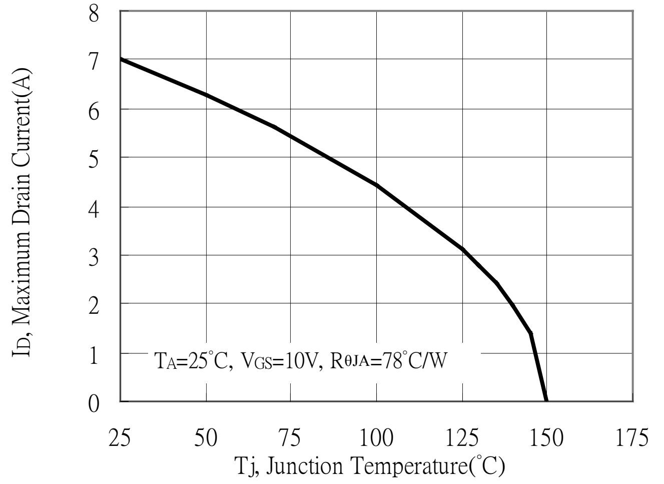

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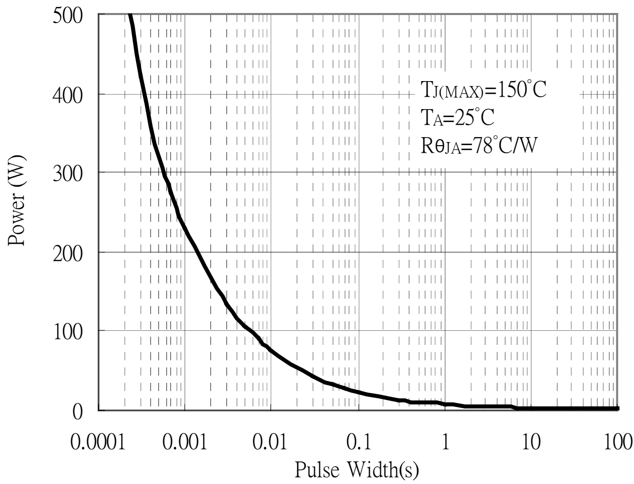
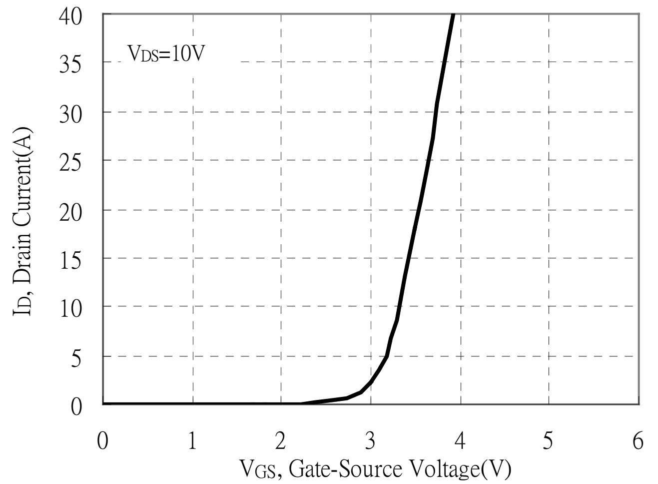
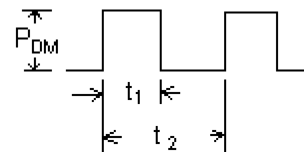
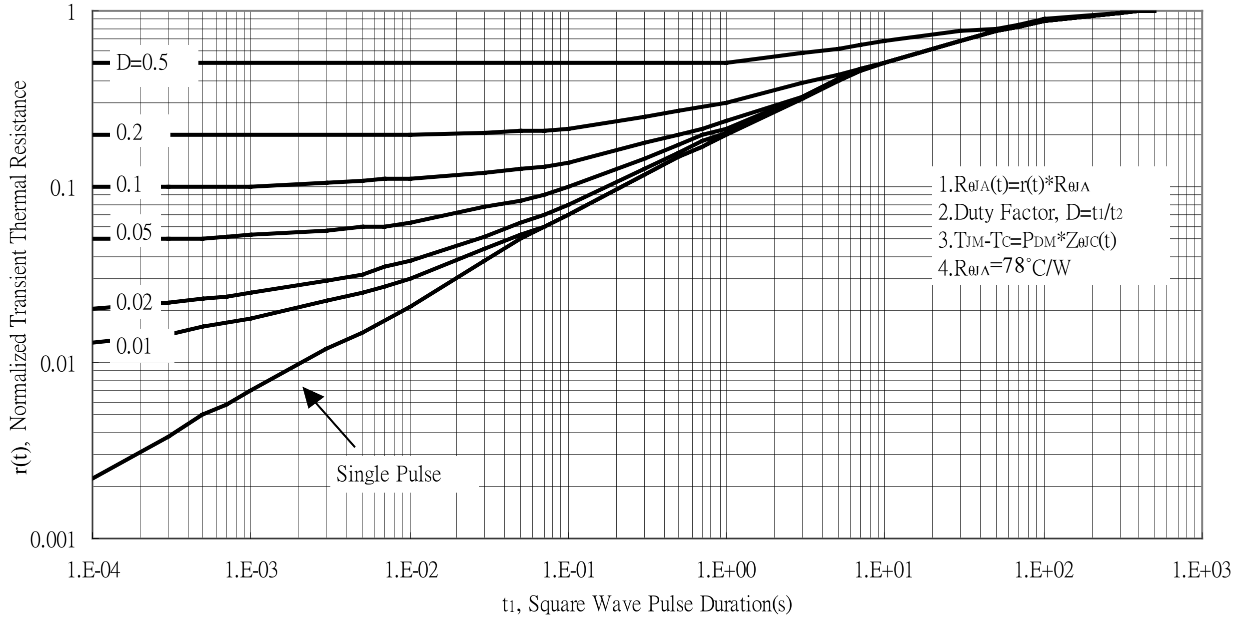
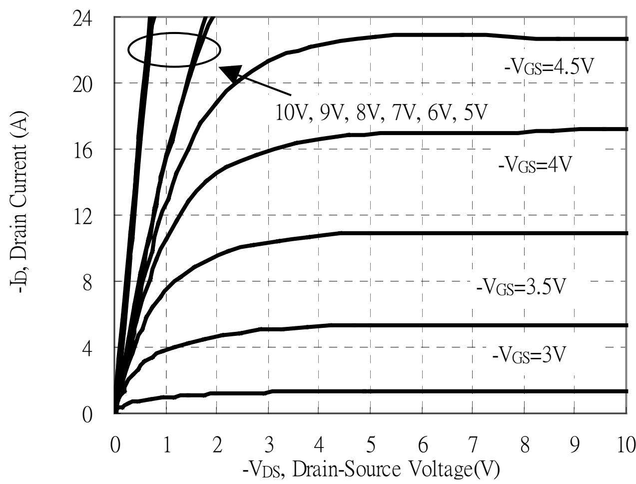


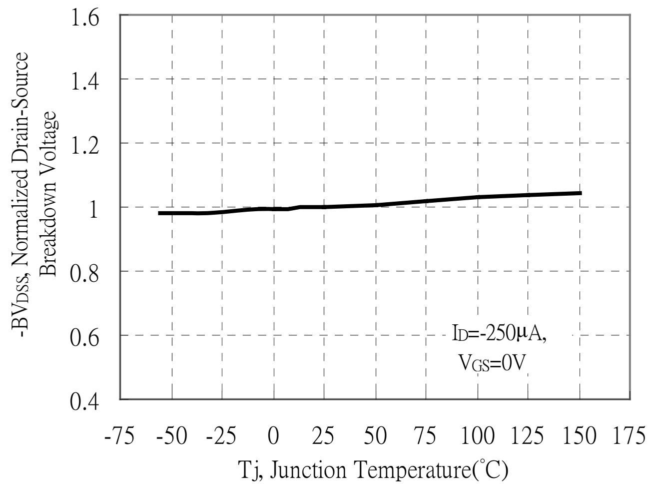


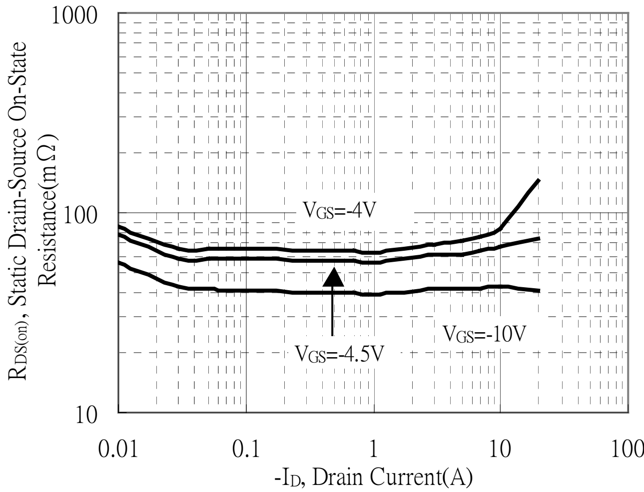


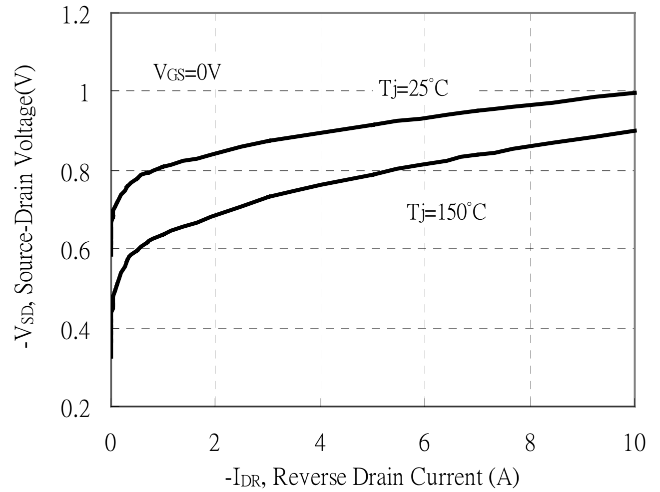


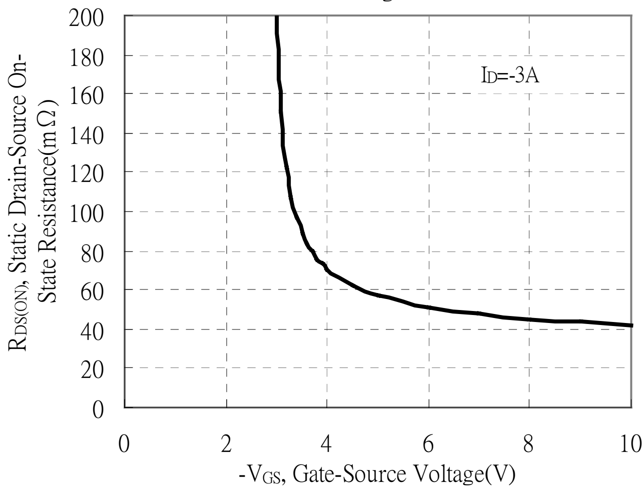
Typical Characteristics : Q2(P-channel)

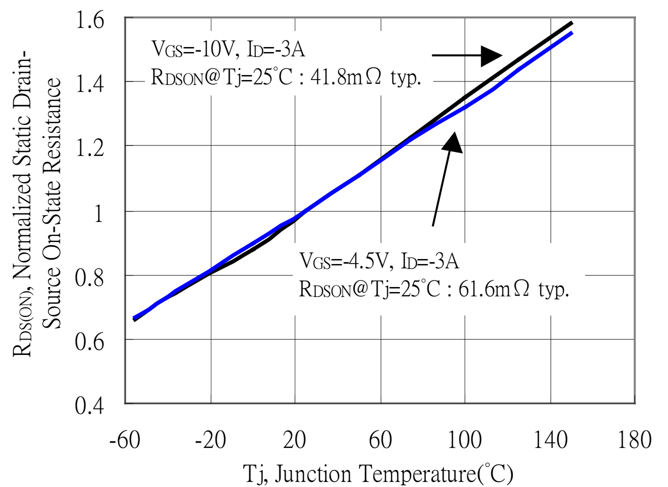




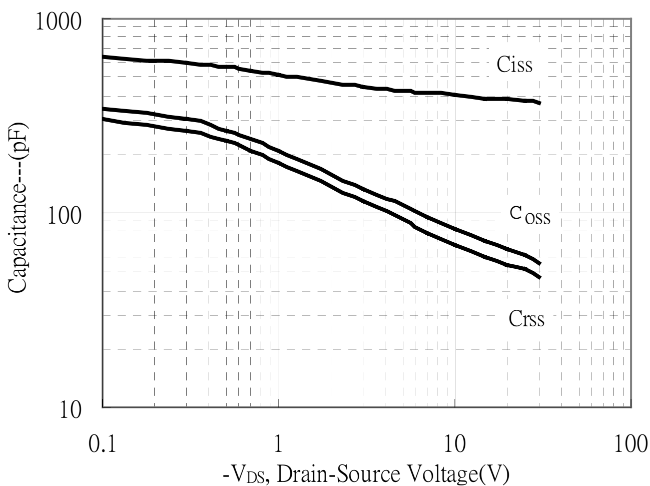


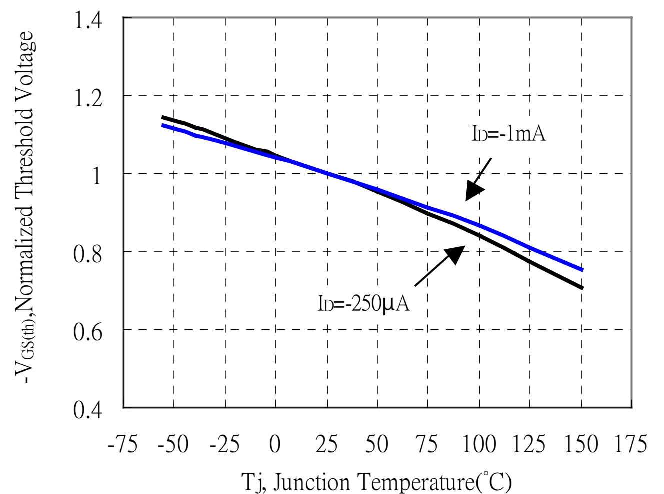


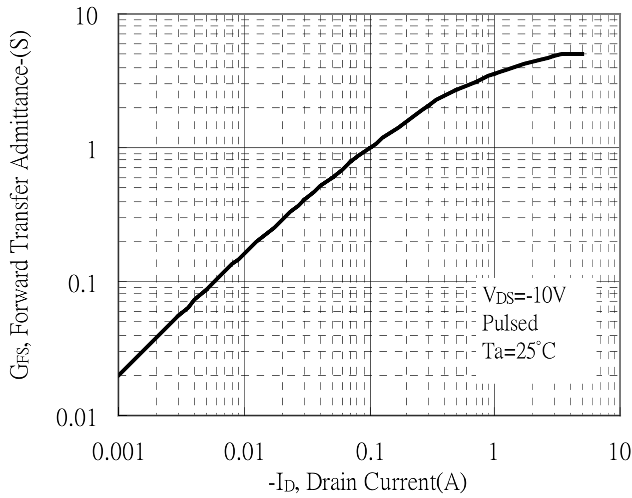


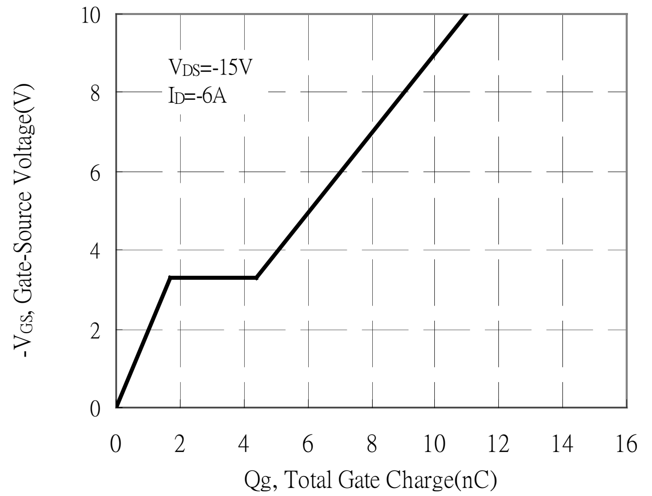


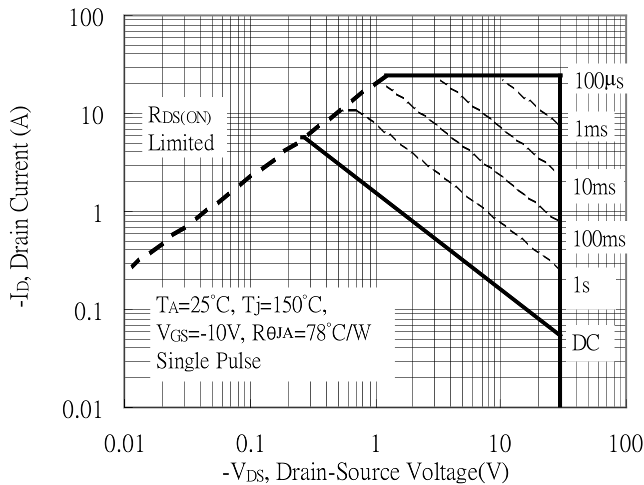
Typical Characteristics(Cont.) : Q2(P-channel)

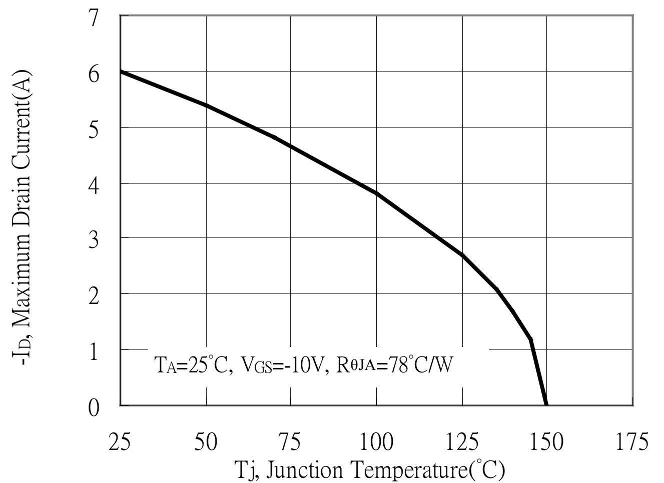












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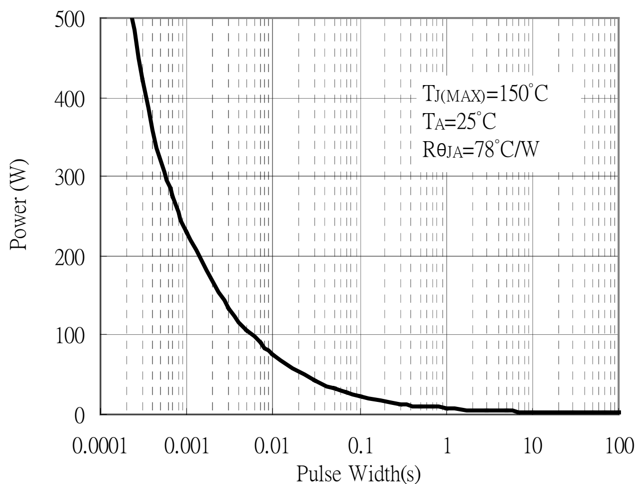
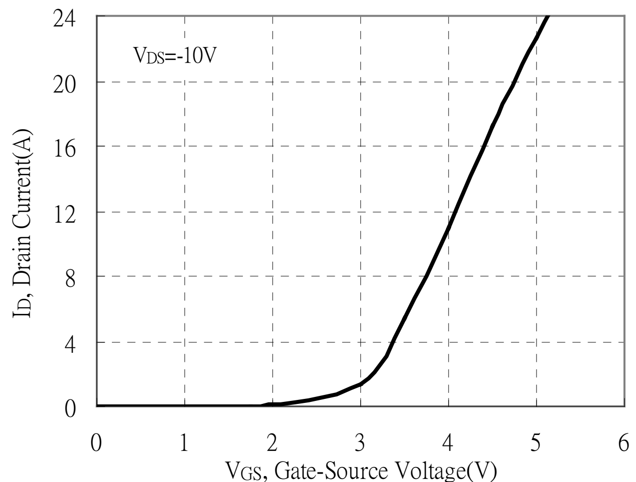
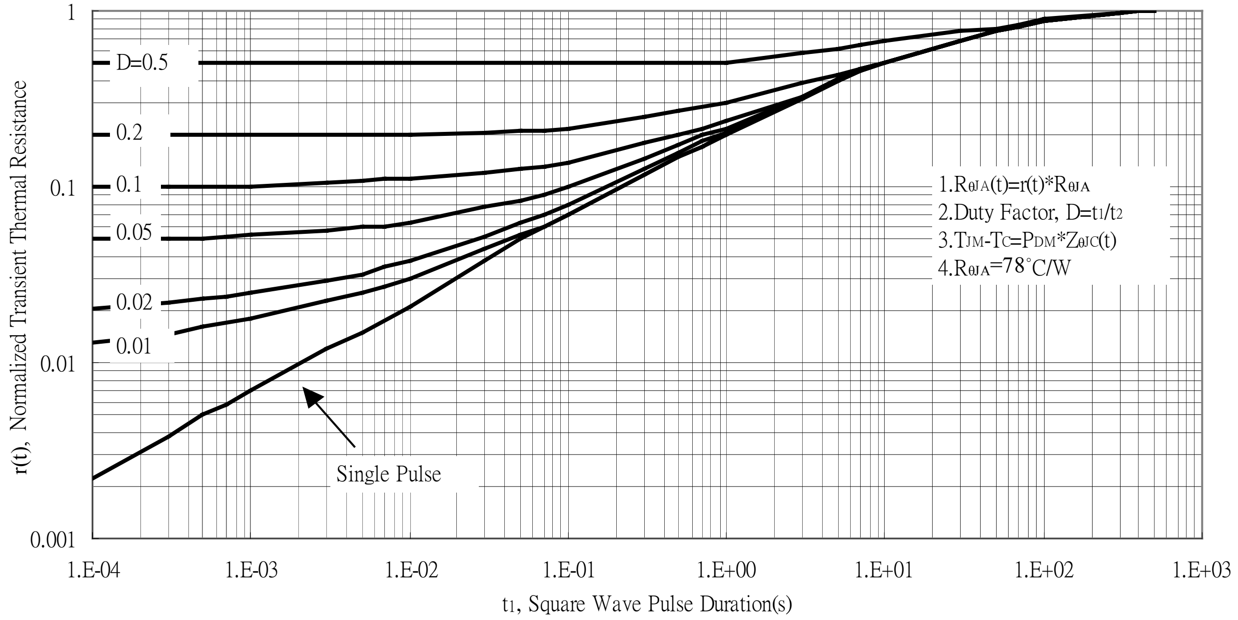
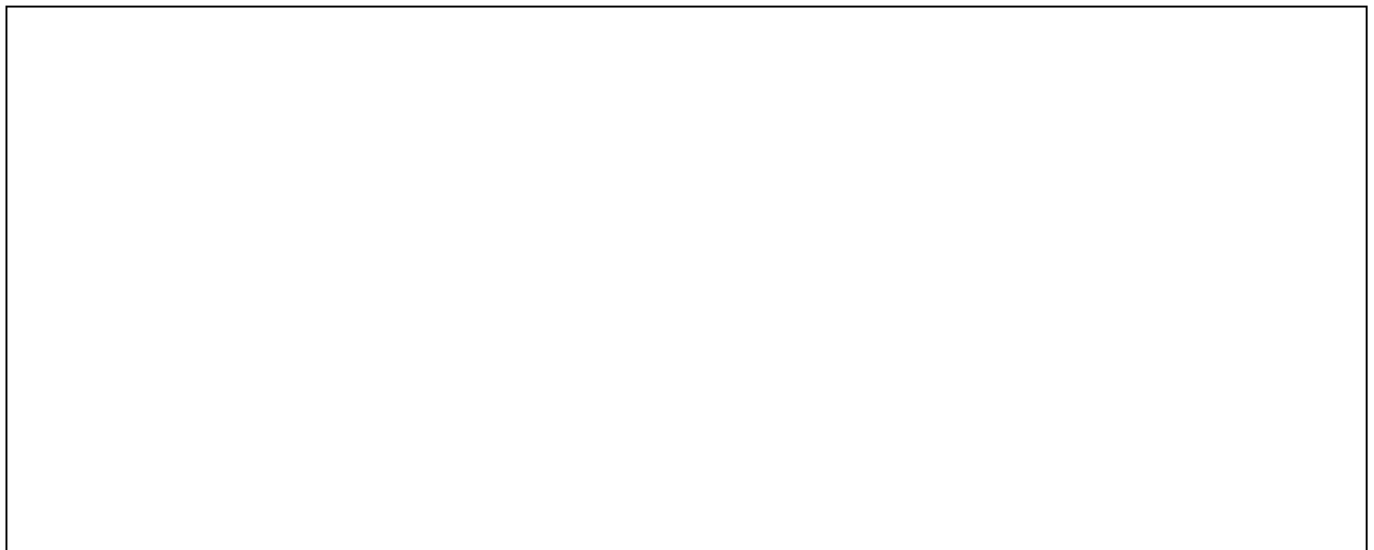
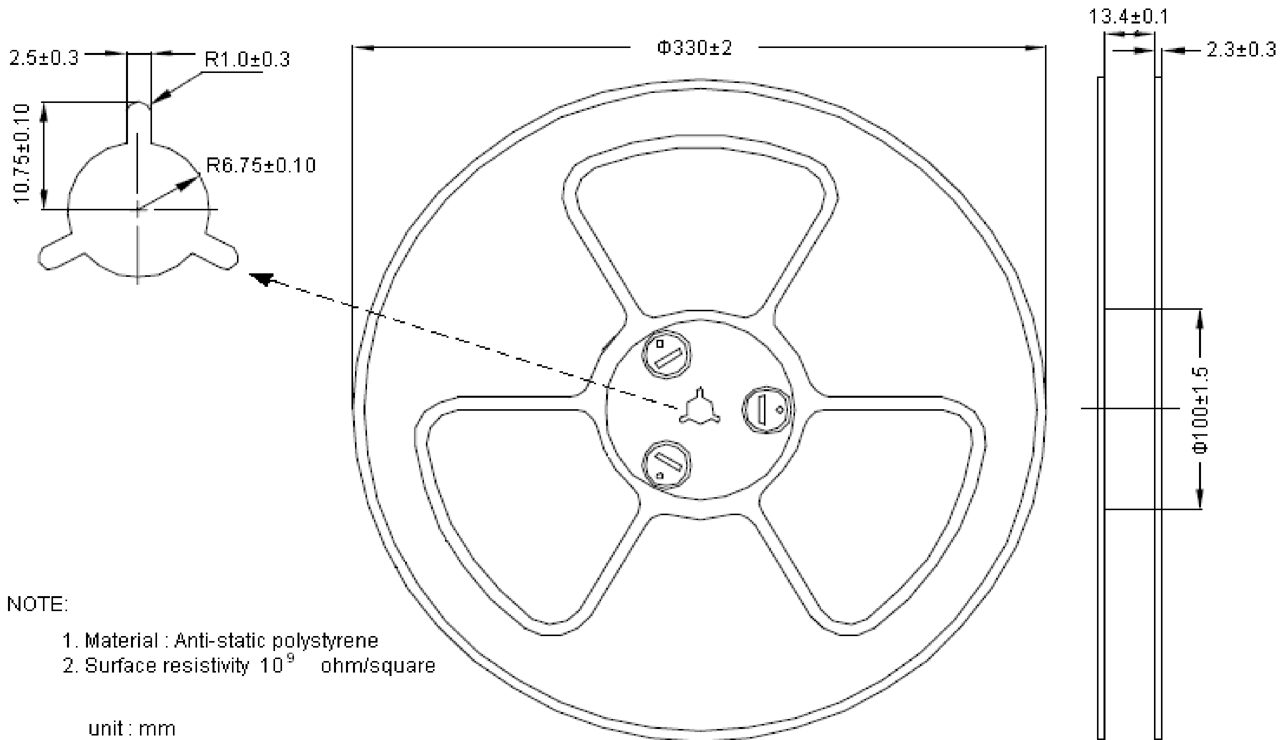




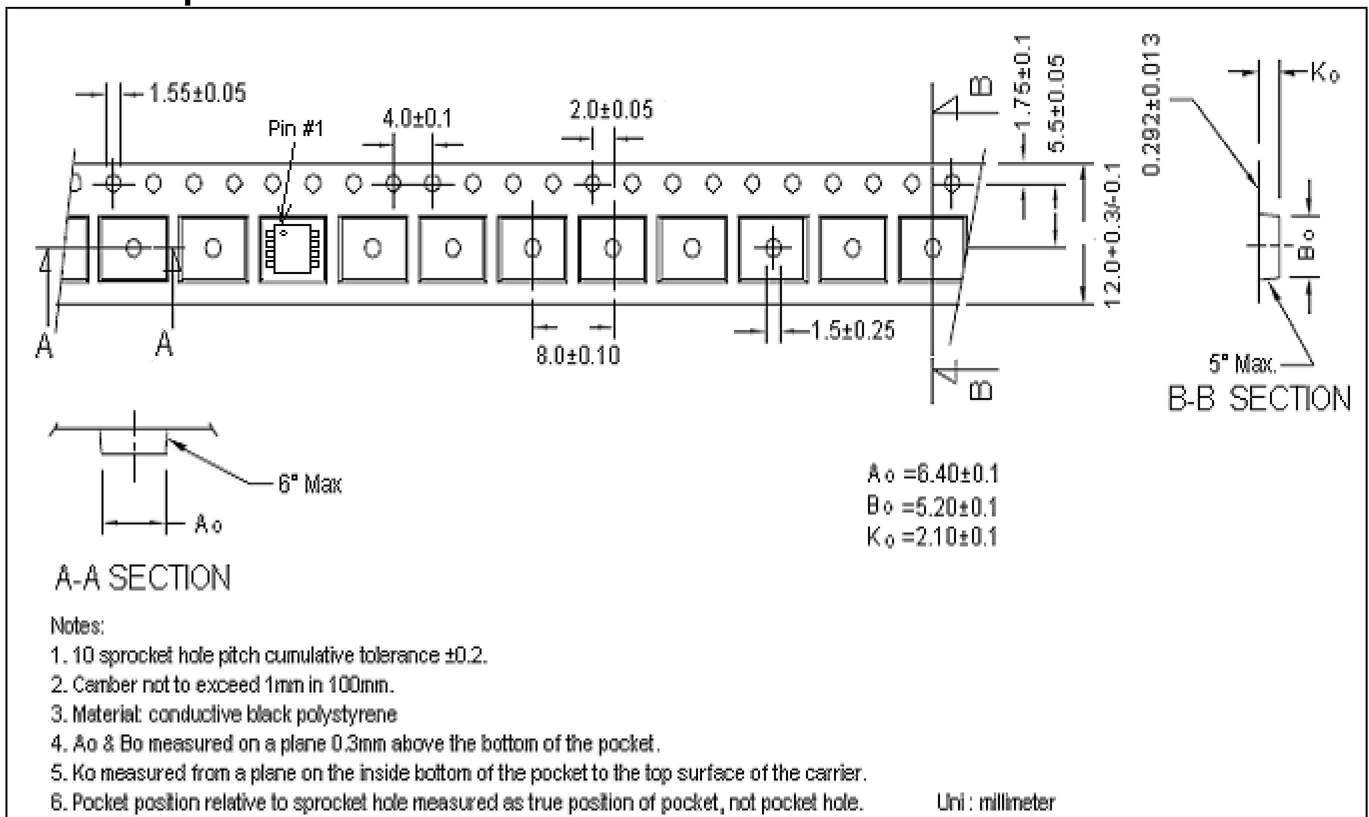


Reel Dimension





Carrier Tape Dimension

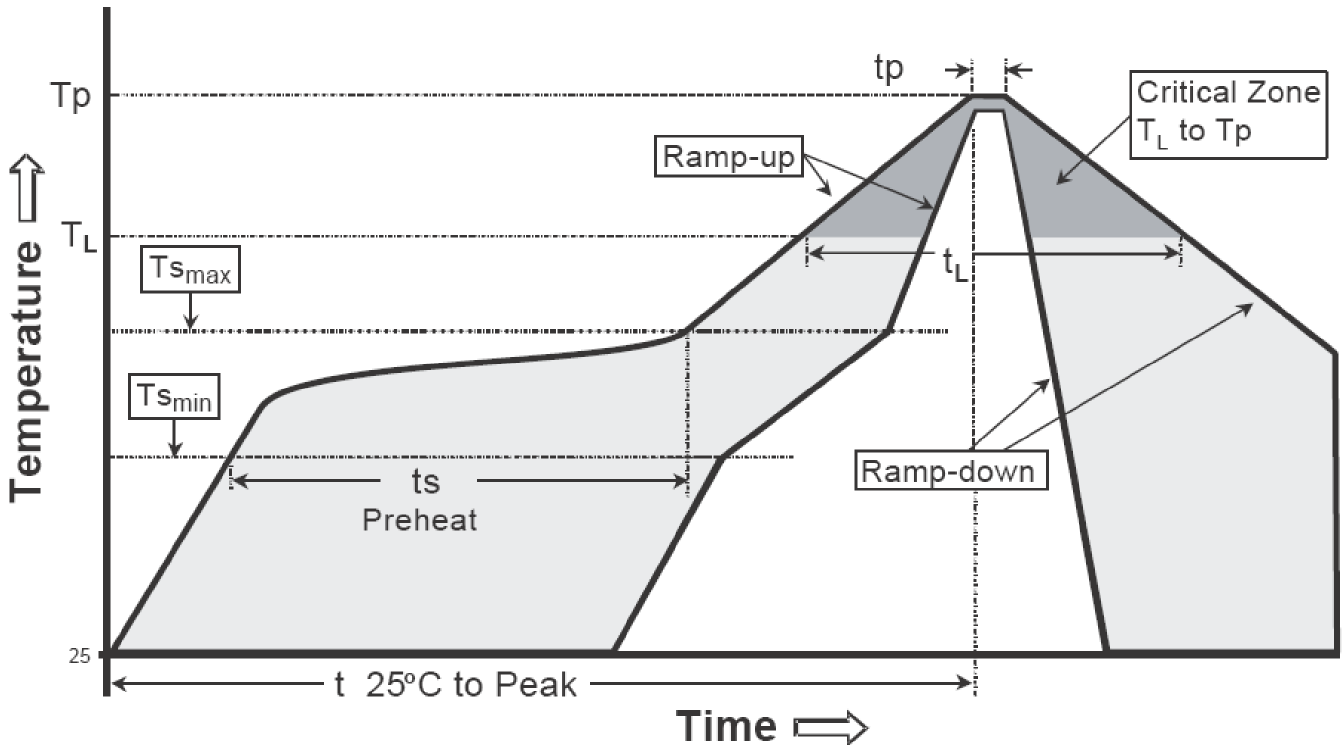


Recommended wave soldering condition

Product	Peak Temperature	Soldering Time

Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

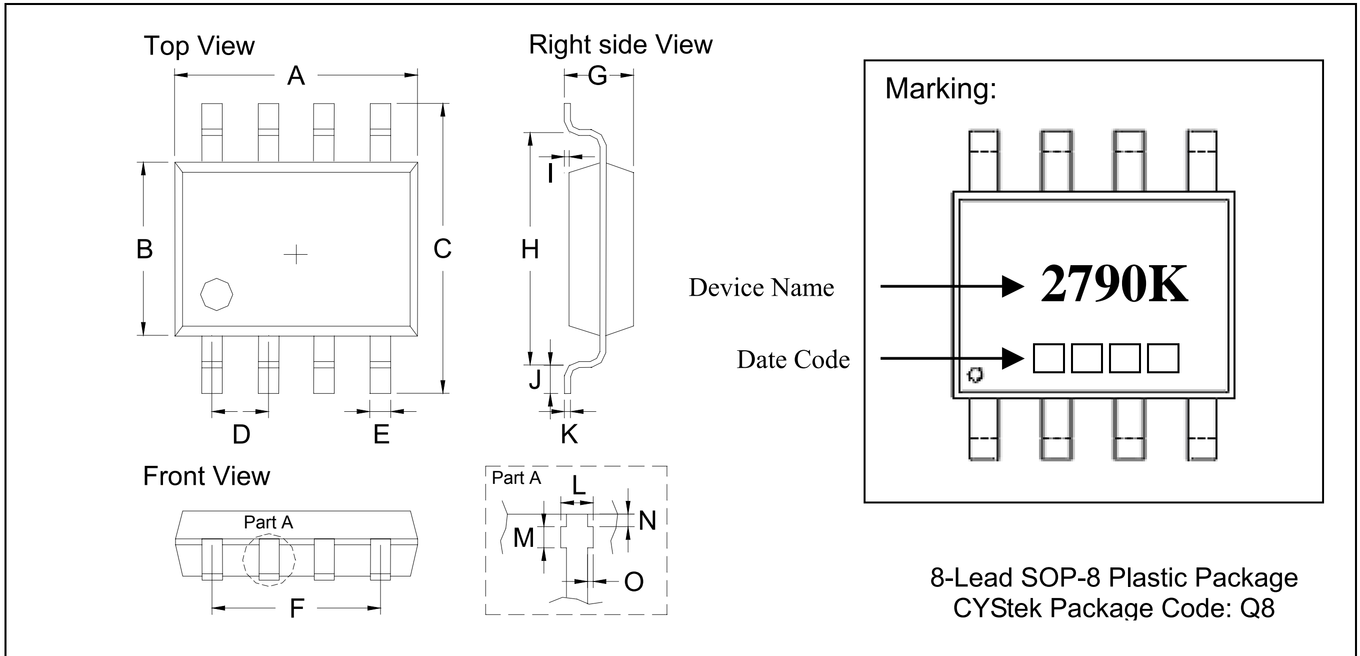
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

SOP-8 Dimension



8-Lead SOP-8 Plastic Package
CYStek Package Code: Q8

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1909	0.2007	4.85	5.10	I	0.0019	0.0078	0.05	0.20
B	0.1515	0.1555	3.85	3.95	J	0.0118	0.0275	0.30	0.70
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0145	0.0185	0.37	0.47	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0570	0.0649	1.45	1.65	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

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